Planning For Extreme and Prolonged Drought Conditions

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Water managers today use hydrologic records of the past century to estimate how climatic conditions would affect future water availability and water needs. Planners take into account the normal fluctuations of wet and dry years in allocating deliveries from reservoirs and in determining how much water will be provided from other sources. Because the state has also experienced extreme and prolonged droughts, the most recent one occurring from 1987 to 1992, many local water agencies have developed drought contingency plans for such rare but extreme conditions that can result in significant socio economic and environmental impacts. The State has provided drought assistance to local water agencies and homeowners with the implementation of Proposition 50, Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002.

Since the last drought (1987-1992) the following notable changes have occurred that would change the demand and supply. Population of California has increased by more than 6 million by year 2001, which will cause additional stress on the available water supply while completion of construction of Coastal Aqueduct (Department of Warer Resurces), Morongo basin pipelines (Mojave Water Agency), Diamond Valley Lake (Metropolitan Water district), Los Vaqueros Reservoir (Contra Costa Water District) and five large scale groundwater recharge/storage projects should add flexibility in operating the water system. Planers should take into account these conditions when planning for another prolonged drought.

Historical Perspective

The most severe recorded drought occurred in 1976-1997. Two consecutive years with little precipitation (fourth driest and the driest year in the recorded history) left California with record low storage in its surface reservoirs and groundwater levels dangerously lowered. Socioeconomic and environmental impacts were very severe during these extreme drought conditions. The total loss due to the drought during these two years exceeded $ 2.5 billion ($6.5 billion at today's cost).

The most recent prolonged drought lasted six years from 1987-1992. During the first 5 years of the drought, in San Joaquin valley the groundwater extractions exceeded the recharge by 11 million acre-feet which caused increased land subsidence in some areas. Department of Water Resources (DWR) studies indicate that in 1990-92, the drought resulted in reduced gross revenues of about $670 million to California agriculture. Energy utilities were forced to substitute hydroelectric power with more costly fossil-fuel generation at an estimated statewide cost of $500 million in 1991. The drought also adversely affected snow-related recreation businesses. Some studies suggest as much as an $85-million loss for snow-related recreation businesses during the winter of 1990-91.

Drought Contingency Planning

Several drought contingency planning reports are already published at state and regional levels, some of which as a result of Legislature. Three bills enacted by the Legislature to improve water supply planning processes at the local level became effective January 1, 2002. In general, the new laws are intended to improve the assessment of water supplies during the local planning process before land use projects that depend on water are approved. The new laws require the verification of sufficient water supplies as a

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condition for approving developments, and they compel urban water suppliers to provide more information on the reliability of groundwater if used as a supply. Normal and drought year conditions are specified in the law when evaluating water supply reliability.

SB 221 (Bus. and Prof. Code, § 11010 as amended; Gov. Code, § 65867.5 as amended; Gov. Code, §§ 66455.3 and 66473.7) prohibits approval of subdivisions consisting of more than 500 dwelling units unless there is verification of sufficient water supplies for the project from the applicable water supplier(s). This requirement also applies to increases of 10 percent or more of service connections for public water systems with less than 500 service connections. The law defines criteria for determining "sufficient water supply, such as using normal, single-dry, and multiple-dry year hydrology and identifying the amount of water that the supplier can reasonably rely on to meet existing and future planned uses. Rights to extract additional groundwater must be substantiated if used for the project.

SB 610 (Water Code, §§ 10631, 10656, 10910, 10911, 10912, and 10915 as amended; Pub. Resources Code, § 21151.9 as amended) and AB 901 (Water Code, §§10610.2 and 10631 as amended; Water Code § 10634) make changes to the Urban Water Management Planning Act to require additional information in Urban Water Management Plans (UWMP) if groundwater is identified as a source available to the supplier. Required information includes a copy of any groundwater management plan adopted by the supplier, proof that the developer or agency has rights to the groundwater, a copy of the adjudication order or decree for adjudicated basins, and if not adjudicated, whether the basin has been identified as being overdrafted or projected to be overdrafted in the most current DWR publication on the basin. If the basin is in overdraft, the UWMP must include current efforts to eliminate any long-term overdraft. A key provision in SB 610requires that any project subject to the California Environmental Quality Act supplied with water from a public water system be provided a water supply assessment, except as specified in the law. AB 901 requires the plan to include information relating to the quality of existing sources of water available to an urban water supplier over given periods and include the manner in which water quality affects water management strategies and supply reliability.

California voters approved the Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002 (Proposition 50; Water Code, § 79500 et seq.) in November 2002. The initiative provides for more than $3.4 billion of funding, subject to appropriation by the Legislature, for a number of land protection and water management activities. Several chapters of Proposition 50 allocate funds for specified water supply and water quality projects, including Chapter 3 Water Security. It provides $50 million to protect State, local and regional drinking water systems from terrorist attack or deliberate acts of destruction or degradation.

Local and Regional Efforts

The urban Water Management Act requires that each urban water agency which serves more than 3,000 people or 3,000 acre-feet per year, to prepare its own water management plan once in every five years. The urban water management plan includes an analysis and a contingency plan for water supply reliability in face of a severe drought which includes up to 50 percent reduction in water supply. Water management plans lay out shortage contingency scenarios that districts will use as guide lines when reducing demand and augmenting short term supply. Long- and short-term conservation measures,

recycling water, water transfers, short-term sources of water, and long term storage including conjunctive use are some of the tools that water districts use to plan against a multi year drought

State Efforts

The Governor's Advisory Drought Planning Panel was formed in 2000 to develop a contingency plan to address the impacts of critical water shortages in California. The panel formed with the recognition that critical water shortages may severely impact the health, welfare, and economy of California. In its July 2000 report, "Preparing for California's Next Drought," the department reviewed items for near-term drought planning, putting California's conditions today into perspective with experiences gained in the 1987-92 drought. Major findings of the report focused on the characterization of drought conditions as a gradual phenomenon and as a function of impacts on water users. The report also addressed the vulnerability of existing water users based on past droughts, and a discussion of current actions that affect drought preparedness planning.

As part of a five year planning program to implement specific actions of the CALFED Bay-Delta Program, a Governor's Drought Panel, in its December 2000 report, "The Critical Water Shortages Contingency Plan," made recommendations for actions that the State government could take to reduce the impacts of critical water shortages. The recommendations included a critical water shortage reduction marketing program to facilitate intra-regional, short term, and dry year transfers, financial and planning assistance to local agencies for drought-related response activities, and assistance to small water Systems and homeowners in rural counties. The work on these programs started early 2002 and is still ongoing through bond measures Proposition 13 (March 2000) and Proposition 50 (November 2002).

Governor's Advisory Drought Planning Panel (2000)

The CALFED Record of Decision (August 2000) called for the governor to convene a panel, chaired by the director of DWR, to develop a contingency plan for reducing impacts of critical water shortages in the next several years while the actions identified in CALFED's Stage 1 were being planned and implemented. The Governor's Advisory Drought Planning Panel identified a variety of physical, regulatory, and institutional challenges to effective water management during times of critical water shortages.

The panel intended the following recommendations to be statewide in scope, applying to any areas of the State that may benefit from them. Nothing in the recommendations is intended to limit their geographical scope to CALFED study areas. The panel did not intend that its recommendations duplicate actions already scheduled for early implementation in the ROD, but rather suggests that ROD actions and the panel's recommended actions be coordinated, as much as possible, to maximize their benefits.

A. Critical Water Shortage Reduction Marketing Program. The panel recognized that the CALFED agencies were tasked with streamlining the water transfer process. In addition to the CALFED actions, the panel recommended that DWR implement a Critical Water Shortage Reduction Marketing Program. The program would be operated as an as-needed water purchasing and allocation program using a three-tiered methodology. Tier 1 would consist of water shortage preparedness activities undertaken by State and local agencies. Tier 2 would consist of purchasing options and allocating water to communities that have maximized their own resources. Tier 3 would be implemented during a water shortage emergency and would include continued implementation of Tier 2 actions, plus extraordinary measures needed to protect public health and safety, such as State

financial assistance for water hauling, pipeline construction, or well drilling. DWR would acquire options to purchase water from willing sellers and would exercise the options as needed to make water available for sale to water users experiencing critical water shortages. The panel further recommended that the governor propose, and that the Legislature provide, a General Fund appropriation for preparing a programmatic EIR for Critical Water Shortage Reduction Marketing Program.

B. Assistance to Small Water Systems and Homeowners in Rural Counties. The panel recommended that DWR develop a technical assistance and education program targeted at rural homeowners and small domestic water systems relying on self-supplied groundwater, to be implemented in consultation with rural county environmental health departments. The panel further recommended that the governor propose, and that the Legislature provide, an annual appropriation of at least $1.5 million from the State General Fund to support this program. The program would include workshops to educate homeowners; a website containing information on State and county well construction requirements, sources of groundwater level and well yield data; and requirements for informing potential home buyers of the groundwater and well conditions and risks.

C. Local Agency Groundwater Programs. The panel recommended that DWR establish an AB 3030 technical assistance program, following the process established in Water Code Section 10795 et seq. The panel further recommended that the governor propose, and that the Legislature provide, an appropriation from the State General Fund of at least $5 million per year to implement the program. In addition, the panel also recommended that the governor propose, and that the Legislature provide, an appropriation of $1 million annually from the State General Fund to provide for ongoing statewide groundwater data collection and compilation (including geohydrologic and water quality data), and that DWR publish this information every five years as updates to Bulletin 118.

D. Local Agency Integrated Water Management Plans. The panel recommended that DWR and other CALFED agencies work in partnership with local water agencies to assist them in developing plans to facilitate integrated management of supplies for agricultural, urban, and environmental purposes. The panel further recommended that DWR provide financial assistance, in the amount of at least $2 million per year from a combination of General Fund, Proposition 204, or Proposition 13 monies to local agencies for preparing integrated water management plans.

E. Drought-Related Research and Public Outreach Activities. The panel recommended that DWR identify and seek funding for research in the areas of long-range weather forecasting, global climate change, and paleoclimatology. The panel recommended that DWR compile existing local agency drought watch indices and develop regional hydrologic drought indices for watersheds important to statewide water supply conditions and watersheds supporting significant urban and agricultural development. The panel also recommended that DWR develop a public outreach program to stress the need for drought preparedness, building on the recommendations of the May 2000 report of the National Drought Policy Commission.

F. Accelerate Proposition 13 Financial Assistance to Local Agencies. The panel urged the governor to take all possible actions to ensure rapid disbursement of Proposition 13 funds, including out-of-State recruitment for new staff, statutory waiver of Water Code requirements for review of DWR rules and regulations by the California Water Commission, and expediting or statutory waiver of Office of Administrative Law review of rules and regulations. The panel further recommended that bond monies applicable to CALFED actions be budgeted as quickly as possible, and that DWR maximize use of grants, rather than capitalization loans, to bring local agencies up to the base level of efficiency contemplated in the CALFED ROD.

DWR has implemented many individual actions aimed at meeting these recommendations. A few examples include:

Operated a dry year water purchasing program

- Held educational workshops for private well owners
- Convened the Small Water System Drought Preparedness Advisory Committee
- Conducted a competitive selection process for grants for preparation of groundwater management plans
- Installed production wells in the Klamath Basin
- Installed monitoring wells in Mendocino County
- Developed a drought preparedness web site
- Co-sponsored an academic conference on droughts

Responding to Future Droughts

In planning for future water supplies and needs, the hydrology of the past century may not be a reasonable measure of the climate in Northern California. The flow record available for California is rather short for determining hydrologic risks, extending back only about 100 years with mostly qualitative information perhaps for another 100 years. Past tree ring studies have shown extensive dry periods far exceeding the six-year maximum that was recorded in the last century. For potential significant reductions to the Sierra snow pack from climate change as it may affect current hydrology is discussed under global climate change.